STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

HEMPHILL HARDWOOD

ROAD PLAN

SECTIONS 16,17 TOWNSHIP 13 NORTH, RANGE 7 WEST, W.M.
PACIFIC COUNTY

LEWIS DISTRICT

AGREEMENT NO.: 30-079010 LEAD FORESTER: David Sund

DATE: 04/01/2006 STAFF ENGINEER: Greg Johnson

DRAWN & COMPILED BY: Alicia Compton

SECTION 0 – SCOPE OF PROJECT

This project includes, but is not limited to optional construction including:

clearing;
grubbing;
right-of-way debris disposal;
excavation and/or embankment to subgrade;
excavation slope stabilization;
subgrade compaction;
acquisition and installation of drainage structures;
acquisition, manufacture, and application of rock;
rock compaction;
landing construction;
grass seeding.

This project also includes but is not limited to pre-haul maintenance including:

Road	Station (s)	Requirements
P&E Mainline	MP 0.00 to MP 2.9	Grade existing surface. Apply, shape/grade and compact a 6” lift of 2 1/2” minus rock.
P&E 1200	MP 0.00 to MP 1.40	Grade and compact existing surface. Reshape and clean ditchlines, culvert headwalls, catch basins and outlets.
P&E 1220	M.P. 0.00 to M.P. 0.87	Grade and compact existing surface. Reshape and clean ditchlines, culvert headwalls, catch basins and outlets.

This project also includes but is not limited to rock pit work including:

Rock Pit	Location(s)	Requirements
P&E Ridge Pit	SE ¼, Sec. 24, T13N, R7W	Excavate and end-haul 1250 c.y. of overburden material to designated waste areas.
P&E Extension Pit	NE ¼, Sec. 29, T13N, R6W	Push 1000 c.y. of overburden material to designated waste area.

SECTION 1 - GENERAL CLAUSES

1.1-1

Clauses in this plan apply to all construction or pre-haul maintenance including landings unless otherwise noted.

1.1-2

Pre-haul maintenance of the following roads and rock pits is required. All roads shall be pre-haul maintained on the State's location and in accordance with this Road Plan.

Road	Stations	Type
P&E Mainline	MP 0.00 to MP 2.90	Pre-haul maintenance
P&E 1200	MP 0.00 to MP 1.40	Pre-haul maintenance
P&E 1220	MP 0.00 to MP 0.87	Pre-haul maintenance

1.1-3

Construction of the following roads is not required. Roads used by the Purchaser shall be constructed on the State's location and in accordance with this Road Plan.

Road	Stations	Type
P&E 1250	0+00 to 14+20	Construction
P&E 1251	0+00 to 4+60	Construction
P&E 1223	0+00 to 12+69	Construction
P&E 1223.5	0+00 to 10+69	Construction
P&E 1221	0+00 to 13+99	Construction

1.1-4

If the Purchaser desires a road location or design change, a revised Road Plan shall be submitted to the State for consideration.

1.1-5

On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.1-7

Hauling of forest products or equipment may require a county road hauling permit. Purchaser is responsible for obtaining a permit, and any costs associated with extra maintenance or repair levied by a county.

1.2-1

The construction or pre-haul maintenance of any roads specified herein shall not be permitted between September 30 and May 1 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2

Purchaser shall not use roads constructed or pre-haul maintained under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2-6

Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Clearing and grubbing shall be completed prior to starting excavation and embankment.

Culvert placement in live streams shall precede embankment where culverts are to be placed along natural ground.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to rock application and/or timber haul.

1.3-2

Roads are intended for dry weather use. Hauling shall be suspended when wheel track rutting exceeds 6 inches unless Purchaser elects to correct the situation at his/her own expense. Corrective measures and continued operations are subject to written approval by the Contract Administrator.

1.4-3

Reference points (R.P.'s) that are moved or damaged at any time during construction shall be reset in their original locations by the Purchaser. Excavation and embankment shall not proceed on road segments controlled by said R.P.'s until all moved or damaged R.P.'s are reset.

1.5-1

Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.

1.5-2

Roads shall be maintained in a condition that will allow the passage of light administrative vehicles.

1.5-3

Snowplowing shall not be permitted unless authorized, in writing, by the Contract Administrator.

SECTION 2 - CLEARING

2.1-1

Fell all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET.

2.1-3

Right-of-way timber shall not be decked within the grubbing limits or in locations that interfere with the construction of the road prism or impede drainage.

SECTION 3 - GRUBBING

3-1

All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET. Those outside the grubbing limits but with undercut roots shall also be removed.

3-2

Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.

SECTION 4 - DEBRIS DISPOSAL AND REMOVAL

4.1-1

Right-of-way debris is defined as all nonmerchantable vegetative material larger than one cubic foot in volume within the grubbing limits.

4.1-2

All right-of-way debris disposal shall be completed prior to the application of rock.

4.2.3-1

Right-of-way debris shall be scattered outside the grubbing limits.

4.2.3-2

Right-of-way debris shall not be placed against standing timber.

SECTION 5 - EXCAVATION

5.1-1

Roads shall be constructed in accordance with dimensions shown on the TYPICAL SECTION SHEET.

5.1-3

Road grade and alignment shall conform to the State's marked location. Grade and alignment shall have smooth continuity, without abrupt changes in direction.

Construction limitations are as follows:

Favorable Grade	Adverse Road Grade	Minimum Curve Radius
18%	15%	60 feet

Changes in road grade shall not exceed 6% within 100 feet. Adverse grades on curves shall not exceed 10% of the curve radius.

5.1-4

Minimum extra widening on the inside of curves shall be:

5 feet extra	80 to 100 foot radius curve
7 feet extra	60 to 80 foot radius curve

5.1-5

Curve widening, where required, shall be added to the inside of curves.

5.1-7

Roads shall be constructed to the dimensions shown on the TYPICAL SECTION SHEET, within the tolerance listed below. Tolerance classes for each road are listed on the TYPICAL SECTION SHEET.

Tolerance Class	A	B	C
Road Width (feet)	+1.5	+1.5	+2.0
Subgrade elevation (feet +/-)	0.5	1.0	2.0
Centerline alignment (feet lt./rt.)	1.0	1.5	3.0

5.1-8

Excavation slopes shall be constructed no steeper than shown on the following table:

Material Type	Excavation Slope Ratio
Common Earth (on side slopes of 55%)	1:1
Common Earth (55% to 70% sideslopes)	¾:1
Common Earth (on slopes over 70%)	½:1
Fractured or loose rock	½:1
Hardpan or solid rock	¼:1

5.1-9

Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-10

Embankments shall be widened as follows:

Height at Centerline	Subgrade Widening
Less than 6 feet	2 feet
6 feet or over	4 feet

5.1-11

Embankment slopes shall be constructed no steeper than shown on the following table:

Material Type	Embankment Slope Ratio
Common Earth and Rounded Gravel	1½:1
Angular Rock	1¼:1
Sandy Soils	2:1

5.1-12

Organic material shall be excluded from road subgrade and embankment as shown on the TYPICAL SECTION SHEET.

5.1-14

Where side slopes exceed 50 percent, full bench construction shall be utilized for the entire subgrade width.

5.1-18

Turnarounds shall be no larger than 30 feet long and 30 feet wide.

5.1.1-1

Waste material shall not be deposited within 50 feet of a cross drain culvert installation.

5.1.1-2

Waste material shall not be deposited within 100 feet of a live stream.

5.1.1-3

Waste material may be deposited adjacent to the road prism on side slopes up to 45 percent if the waste material is compacted and more than 100 feet away from live streams. On side slopes of 45 percent or more, all excavation shall be end hauled or pushed to designated embankment sites.

5.1.1-5

When constructing landings, waste material shall not be placed on side slopes steeper than 45%.

5.1.2-1

Common borrow shall contain no more than 5% clay, vegetative debris, or other waste material by volume.

5.1.2-2

Common borrow shall be used at the following location:

Road	Stations	Source
P&E 1250	3+84 to 4+78	1+87 to 3+84—Layback excavation slope.
P&E 1250	8+19	6+54 to 7+80—Layback excavation slope.

5.2-1

Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the grubbing limits, or restrict drainage.

5.3-1

All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts. Side hill embankments too narrow to accommodate excavation equipment may be placed by end-dumping or side casting until sufficiently wide to support the equipment.

5.3-3

On the following road, embankments shall be compacted in lifts not to exceed 12 inches. Compaction shall consist of three coverages over the entire width of each lift with a vibratory drum roller weighing a minimum of 14,000 pounds at a maximum operating speed of 1 mph.

Road	Stations
P&E 1250	8+19

5.4-1

Silt-bearing runoff shall not be permitted to go into streams.

5.4-2

Accomplish sediment removal through silt traps, silt fences, settling ponds, or other methods as approved, in writing, by the Contract Administrator.

5.4-3.1

On the following roads, Purchaser shall furnish and evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 40 pounds per acre. The date of application is subject to approval by the Contract Administrator.

Mixture Percent by Weight	Minimum Percent Germination
50% Fescue, Red	90% Germination
25% Ryegrass, Perennial	90% Germination
15% Bentgrass	85% Germination
10% Clover, White and White Dutch (inoculated)	90% Germination

Weed seed shall not exceed 0.5% by weight.

Seed shall be furnished in standard containers on which the following shall be shown:

1. Common name of seed
2. Net weight
3. Percent of purity
4. Percentage of germination
5. Percentage of weed seed and inert material

Required seed not spread by the termination of this contract shall become property of the State. The amount owed to the State shall be as follows, less the amount spread.

Road	Stations	Seed Quantity (lbs)
P&E 1250	0+00 to14+20	40
P&E 1251	0+00 to 4+60	15
P&E 1223	0+00 to 12+69	35
P&E 1223.5	0+00 to 10+69	30
P&E 1221	0+00 to 13+99	40

5.4-6

On the following road, Purchaser shall stabilize excavation slope by applying RIPRAP. RIPRAP shall be applied in quantities specified in the ROCK LIST to exposed soil on the excavated slope and ditch at such a depth as to prevent surface erosion of slope.

Road	Stations
P&E 1250	8+75 to 9+30

5.5-4

Constructed subgrades shall be compacted full width except ditch prior to rock application. Compaction shall be by a smooth-drum vibratory roller weighing at least 14,000 pounds. Four complete passes shall be made at a maximum operating speed of 3 mph.

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

5.5-6

A grader shall be used to crown the existing surface and the surface shall be compacted full width except ditch. Compaction shall be by smooth-drum vibratory roller weighing at least 14,000 pounds. Four complete passes shall be made at a maximum operating speed of 3 mph.

Road	Stations
P&E 1200	M.P. 0.00 to M.P. 1.40
P&E 1220	M.P. 0.00 to M.P. 0.87

6.2.1-1

Purchaser shall furnish, install, and maintain corrugated polyethylene pipe (AASHTO specification No. M-294 Type S) as designated on the CULVERT LIST. Culvert and flume lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator.

6.2.1-2

Manufacturer's approved hinged split coupler bands shall be used on corrugated polyethylene pipe, bands shall have a minimum of 4 corrugations, 2 on each side of the pipe joint.

6.2.1-7

On the following road, installation of culvert shall be in accordance with the Forest Practice Permit Conditions.

Road	Stations
P&E 1250	8+19

6.2.2.1-1

Culvert, downspout, flume, and energy dissipator installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL and the Corrugated Polyethylene Pipe Association "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."

6.2.2.3-1

Cross drains and surface culverts on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline, except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.3-2

On the following roads, reshaping and cleaning the ditchlines, culvert headwalls, catch basins and outlets shall be completed prior to surface compaction and shall be done in accordance with the TYPICAL SECTION SHEET and CULVERT AND DRAINAGE SPECIFICATION DETAIL.

Road	Stations
P&E 1200	MP 0.00 to MP 1.40
P&E 1220	MP 0.00 to MP 0.87

6.4-1

Catch basins shall be constructed to resist erosion in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL.

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts.

6.5-2

On the following roads, embankment slopes adjacent to culvert inlets and outlets at live stream crossings shall be armored with machine placed light loose riprap for a distance of one culvert diameter on each side of the pipe and one culvert diameter above the pipe in accordance with the CULVERT LIST.

Road	Stations
P&E 1250	8+19

SECTION 7 - ROCK

7.1-1

Rock for construction and/or pre-haul maintenance under this contract may be obtained from sources on State land as listed below at no charge to the Purchaser. Development and use shall be in accordance with the attached written "Development Plan" prepared by the State. Upon completion of operations, the rock source shall be left in the condition specified in said plan, subject to approval by the Contract Administrator. Use of material from any other source must have prior written approval from the Contract Administrator. If other operators are using or desire to use these rock sources, joint operating plans shall be developed. All parties shall follow these plans. Purchaser shall give the Contract Administrator 5 days notice prior to commencing any operations in the listed rock pits.

Source	Location
P&E Ridge Pit	SE ¼, Section 24, T13N, R7W
P&E Extension Pit	NE ¼, Section 29, T13N, R6W

7.1-3

All rock source operations shall be conducted as directed by the Contract Administrator and in accordance with an approved development plan.

7.1-7

The following pit work is required. Work is to be done according to the approved “pit plan” and as directed by the contract administrator.

Source/ Location	Requirements
P&E Ridge Pit	Excavate and end-haul 1,250 c.y. of overburden material to designated waste areas.
P&E Extension Pit	Push 1,000 c.y. of overburden material to designated waste area.

7.2.1-1

Purchaser shall crush rock from the P&E Extension Pit to manufacture 8,287 cubic yards truck measure of 2½ INCH MINUS rock.

7.2.1-4

Rock shall meet the following specifications for gradation when placed in hauling vehicles or during manufacture and placement into a stockpile. The exact point of evaluation for conformance to specifications will be determined by the Contract Administrator.

7.2.1.1-5

2½ INCH MINUS CRUSHED ROCK

% passing 2½” square sieve	100%
% passing 2” square sieve	65 -100%
% passing 1” square sieve	50 - 70%
% passing ¼” square sieve	30 - 50%
% passing U.S. #40 sieve	16% Max.
% passing U.S. #200 sieve	5% Max.

All percentages are by weight.

7.2.1.1-8

4 INCH IN PLACE rock shall have a minimum of 90 percent of the top 4 inches of the running surface pass a 4 inch square opening. In place processing such as grid rolling, jaw crushing, or other such method as demonstrated by the Purchaser to be effective, shall be required if necessary to achieve this requirement.

7.2.1.1-9

6 INCH MINUS ROCK

% equal to, or smaller in one dimension than the specified size	100%
% passing U.S. #40 sieve	16% Max.
% passing U.S. #200 sieve	5% Max.

All percentages are by weight.

7.2.1.1-10
8 INCH PLUS ROCK

% equal to, or larger in one dimension
than the specified size 100%
% passing U.S. #40 sieve ..... 16% Max.
% passing U.S. #200 sieve ..... 5% Max.

All percentages are by weight.

7.2.1.1-12
Landing rock shall be no coarser than 6 INCH MINUS.

7.2.1.2-2
4 INCH IN PLACE rock shall contain no more than 5 percent by weight of vegetative debris, dirt, or trash.

7.2.2-1
Rock crushing operations shall conform to the following specifications:

a. The Purchaser shall provide a weatherproof field laboratory equipped with gradation testing equipment. This laboratory shall be available for use by the Contract Administrator during the entire crushing operation.

7.2.3-1
Measurement of the 2 1/2 INCH MINUS CRUSHED rock stockpile shall be on a cubic yard truck measure basis. Each truck box shall be measured by the Contract Administrator prior to rock hauling. The Contract Administrator shall periodically require that a load be flattened off and its volume calculated. An average of such volumes for each truck shall be used to tally the volume to be hauled. The Purchaser shall provide and maintain load tally sheets for each truck and shall give them to the Contract Administrator upon request.

7.2.4-1
Rock drilling and shooting shall meet the following specifications:

a. Oversize material remaining in the rock source at the conclusion of the timber sale shall not exceed 5 percent of the total volume mined for the sale.

b. Oversize material is defined as rock fragments larger than two feet in any dimension.

c. The Purchaser shall submit an informational drilling and shooting plan to the Contract Administrator 10 working days prior to any drilling. (Form #M-126PAC).

7.3-1
Rock stockpiles shall meet the following specifications:

Before placing aggregates upon the stockpile site, the site shall be cleared of vegetation, trees, stumps, brush, rocks, or other debris and the ground leveled to a smooth, firm, uniform surface.

The piles, when completed, shall be neat and regular in shape. The stockpile height shall be limited to a maximum of 24 feet. Stockpiles in excess of 200 cubic yards shall be built up in layers not more than 4 feet in depth. Stockpile layers shall be constructed by trucks, "clamshells" or other methods approved, in writing, by the Contract Administrator. Pushing aggregates into piles with a bulldozer shall not be permitted. Each layer shall be completed over the entire area of the pile before depositing aggregates in the next layer. The aggregate shall not be dumped so that any part of it runs down and over the lower layers in the stockpile. The method of dropping from a bucket or spout in one location so as to form a cone shaped pile will not be permitted.

No equipment other than pneumatic tired equipment shall be used on stockpiles. Stockpiles of different types or sizes of aggregate shall be spaced far enough apart, or separated by suitable walls or partitions, to prevent the mixing of the aggregates.

7.3-2
Crushed material shall be stockpiled in the Squally Jim Pit as directed by the Contract Administrator in accordance with plan dated 03/21/2006.

7.4.2-1

Apply at least the minimum required rock depth as shown on the ROCK LIST. Rock shall meet the specifications on the ROCK LIST.

7.4.2-5

Subgrade shall be approved, in writing, by the Contract Administrator prior to application of rock.

7.4.2-6

A grader shall be used to shape the subgrade prior to subgrade compaction.

7.4.2-8

Apply 50 cubic yards of rock to each landing from a rock source subject to written approval by the Contract Administrator.

7.4.2-9

Turnarounds and curve widening shall have rock applied to the same depth and specifications as the traveled way.

7.4.2-10

Each lift of rock shall be crowned as shown on TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

7.4.3-2

Rock shall be spread and compacted full width in one lift, each not to exceed 12 inches uncompacted depth. Compaction shall be by smooth drum vibratory roller weighing at least 14,000 pounds. Five complete passes at a maximum speed of 3 mph shall be made on each lift.

7.4.4-1

Riprap shall consist of angular stone, placed as indicated in this plan or as directed by the Contract Administrator.

Loose Riprap - The stone for loose riprap shall be hard, sound and durable. Loose riprap shall be free of rock fines, soil, or other extraneous material.

b. Light Loose Riprap - Shall meet the following requirements for grading:

At Least/Not More Than	Size Range	Maximum Size
20% / 90%	300 lbs. to 1 ton	--
80% / --	50 lbs. to 1 ton	--
10% / 20%	--	50 lbs.

7.4.4-2

Riprap shall be set in place in conjunction with or immediately following construction of the embankment. Placement shall be by zero drop height methods only.

SECTION 9 - ROAD AND LANDING DEACTIVATION

9.2-1

Purchaser shall reduce or relocate landing debris, in a manner approved, in writing, by the Contract Administrator, to avoid landing failures and potential debris slides.

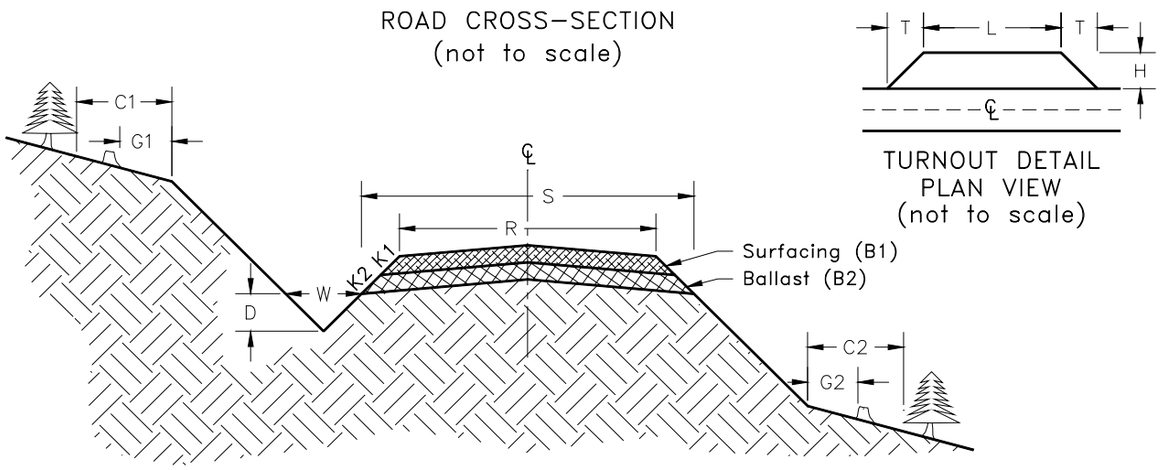
9.2-2

Purchaser shall provide for drainage of the landing surface as approved, in writing, by the Contract Administrator.

9.2-3

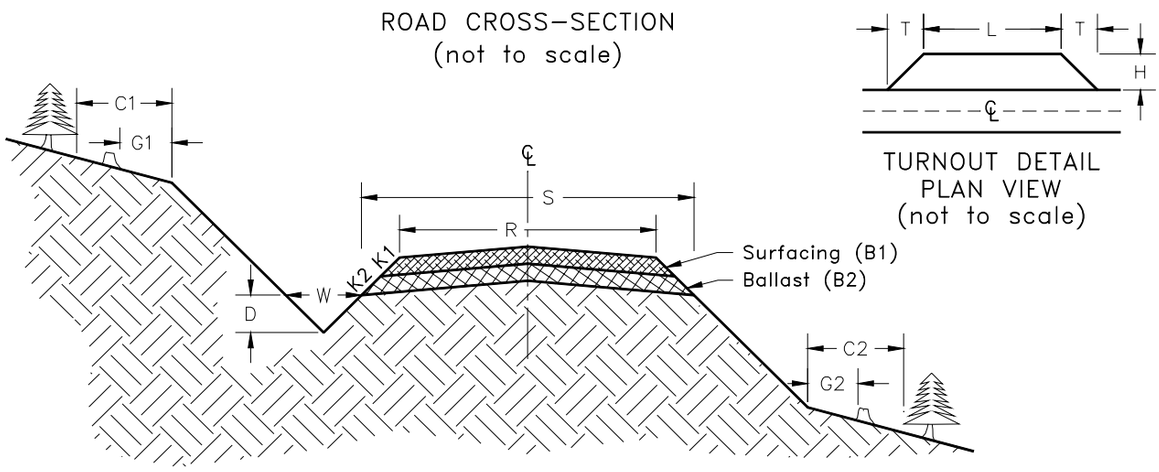
Landing embankments shall be sloped to original construction specifications.

TYPICAL SECTION SHEET



Road Number	From Station	To Station	Tolerance Class	Subgrade Width	Road Width	Ditch		Crown in. @ CL	Grubbing Limits		Clearing Limits	
						Width	Depth					
				S	R	W	D		G1	G2	C1	C2
P&E Mainline	MP 0.00	MP 2.9	C	18’	14’	--	--	4”	--	--	--	--
P&E 1200	MP 0.00	MP 1.40	C	16’	12’	3’	1’	4”	--	--	--	--
P&E 1220	MP 0.00	MP 0.87	C	16’	12’	3’	1’	4”	--	--	--	--
P&E 1250	0+00	14+20	C	16’	12’	3’	1’	4”	5’	5’	10’	10’
P&E 1251	0+00	4+60	C	16’	12’	3’	1’	4”	5’	5’	10’	10’
P&E 1223	0+00	12+69	C	16’	12’	3’	1’	4”	5’	5’	10’	10’
P&E 1223.5	0+00	10+69	C	16’	12’	3’	1’	4”	5’	5’	10’	10’
P&E 1221	0+00	13+99	C	16’	12’	3’	1’	4”	5’	5’	10’	10’

ROCK LIST



BALLAST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout Length	Turnout Width	Turnout Taper
			K2	B2					L	H	T
					4 INCH IN PLACE			P&E Ridge			
P&E 1250	0+00	4+78	1 ½:1	15”	81	4.78	387				
	4+78	14+20	1 ½:1	18”	100	9.42	942				
	Curve Widening		1 ½:1	18”	50	2	100				
	Landing (1)						50				
P&E 1251	0+00	4+60	1 ½:1	18”	100	4.6	460				
	Landing (1)						50				
P&E 1223	0+00	10+17	1 ½:1	13”	69	10.17	702				
	10+17	12+69	1 ½:1	16”	87	2.52	219				
	Landings (3)						150				
P&E 1223.5	0+00	7+53	1 ½:1	13”	69	7.53	520				
	7+53	10+69	1 ½:1	16”	87	3.16	275				
	Curve Widening		1 ½:1	16”	45	1	45				
	Landing (1)						50				
P&E 1221	0+00	13+99	1 ½:1	12”	63	13.99	881				
	Landing (1)						50				
P&E 1200	Landings (3)						150				
P&E 1220	Landing (1)						50				
					RIPRAP						
P&E 1250	Slope Stab. & Culvert						42				
					8 INCH PLUS						
Culverts							8				

BALLAST TOTAL 5,081 Cubic Yards
RIPRAP TOTAL 42 Cubic Yards
8 INCH PLUS TOTAL 8 Cubic Yards

SURFACE

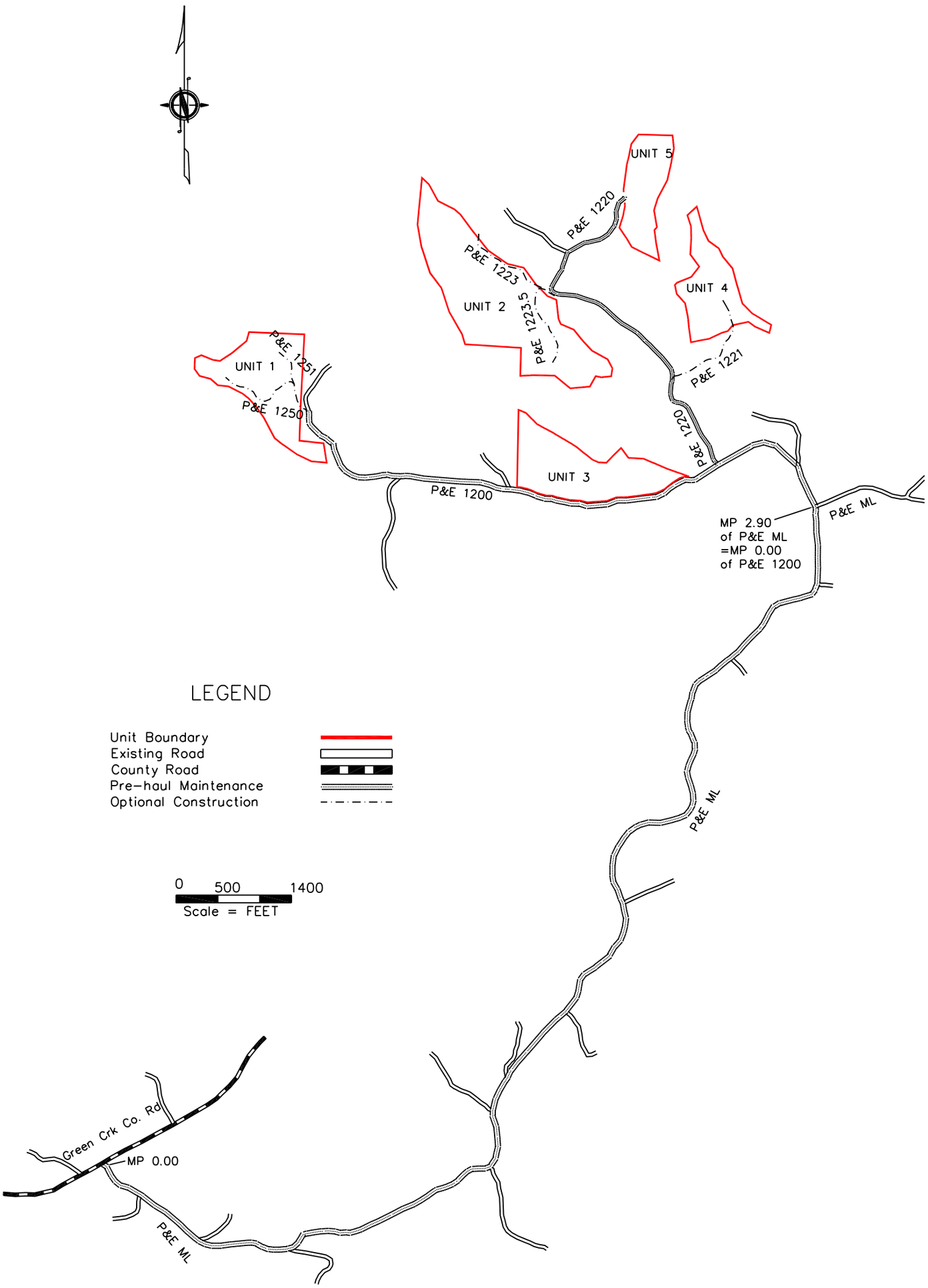
Road Number	From Station	To Station	Rock Slope K1	Compacted Rock Depth B1	C.Y./ Station	# of Stations	C.Y. Total	Rock Source
					2 1/2 INCH MINUS CRUSHED			P&E Extension
P&E Mainline	0+00	153+12	1 ½:1	6”	30	153.12	4,594	
P&E 1250	0+00	4+78	1 ½:1	4”	19	4.78	91	
P&E 1223	0+00	10+17	1 ½:1	4”	19	10.17	193	
P&E 1223.5	0+00	7+53	1 ½:1	4”	19	7.53	143	
P&E 1221	0+00	13+99	1 ½:1	4”	19	13.99	266	
Stockpile							3,000	

SURFACE TOTAL 8,287 Cubic Yards

HEMPHILL HARDWOODS

ROAD PLAN MAP

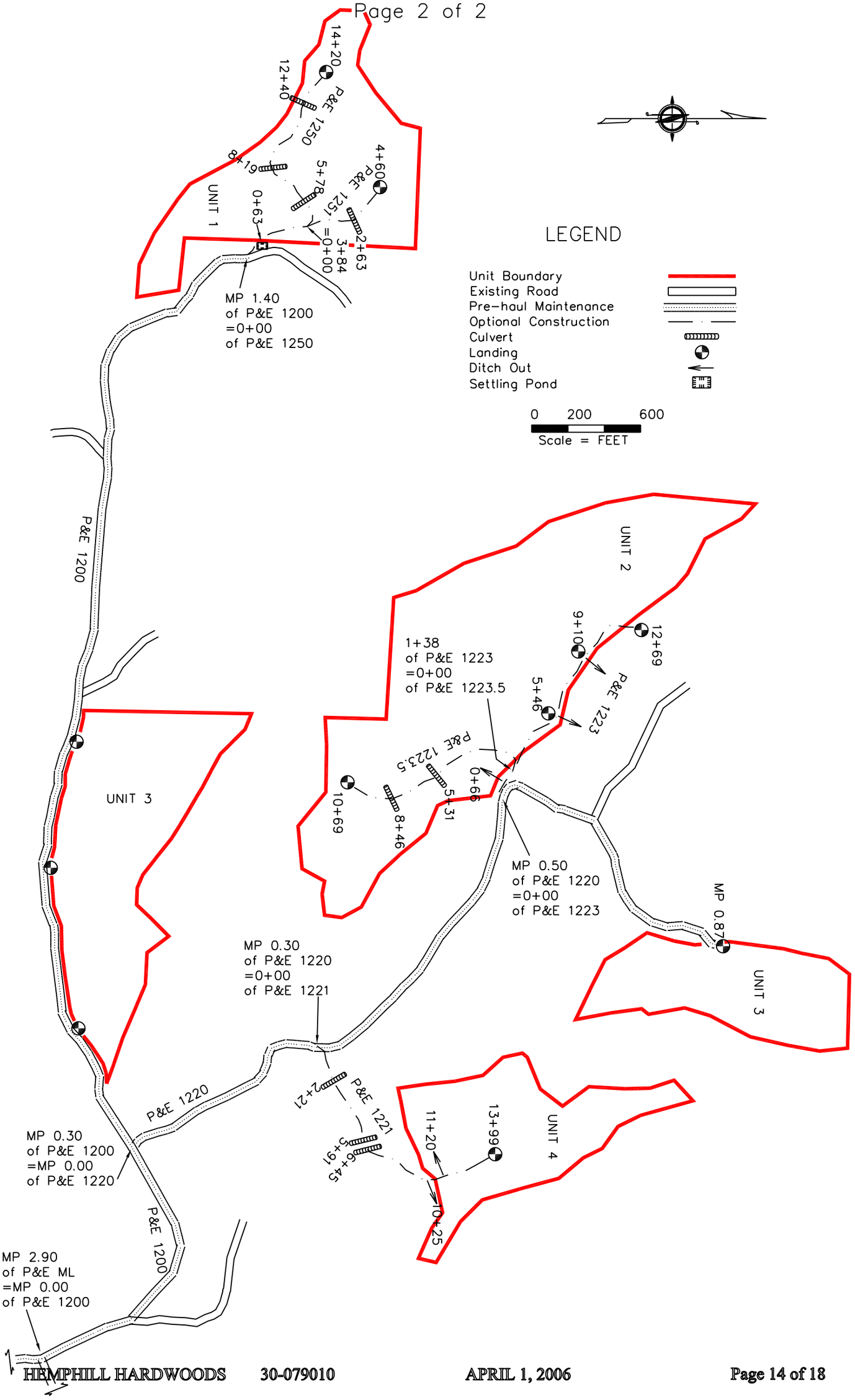
Page 1 of 2



HEMPHILL HARDWOODS

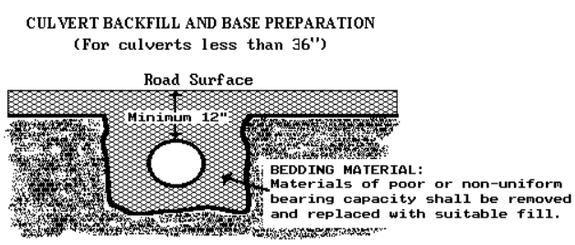
ROAD PLAN MAP

Page 2 of 2



CULVERT LIST

Road Number	Location	Culvert Dia.	Culvert Gauge	Length (ft) Culvert	Length (ft) Downspt	Length (ft) Flume	Riprap (C.Y.) Inlet	Riprap (C.Y.) Outlet	Riprap (C.Y.) Type	Backfill Material	Placement Method	Const. Staked	Remarks
			If Steel										
P&E 1250	0+63	-	-	-	-	-	-	-	-	-	-	-	Install (1) 2' D x 2'W x 4'L sediment trap on right.
	5+78	18"	-	30	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
	8+19	24"	-	70	-	-	6	6	LL	NT	-	-	Live stream
	12+40	18"	-	30	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
P&E 1251	2+63	18"	-	30	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
P&E 1223.5	5+31	18"	-	32	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
	8+46	18"	-	32	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
P&E 1221	2+21	18"	-	30	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
	5+91	18"	-	36	-	-	0.5	0.5	8"+	NT	-	-	Cross-drain
	6+45	18"	-	40	-	-	0.5	0.5	8"+	NT	-	-	Live Stream

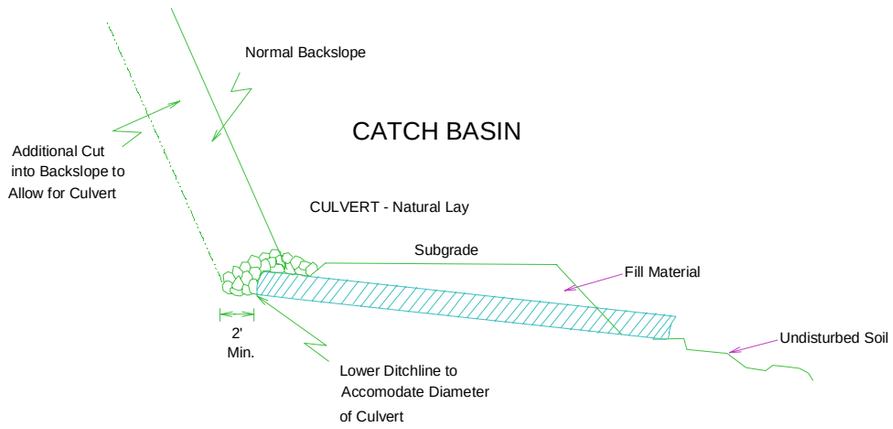


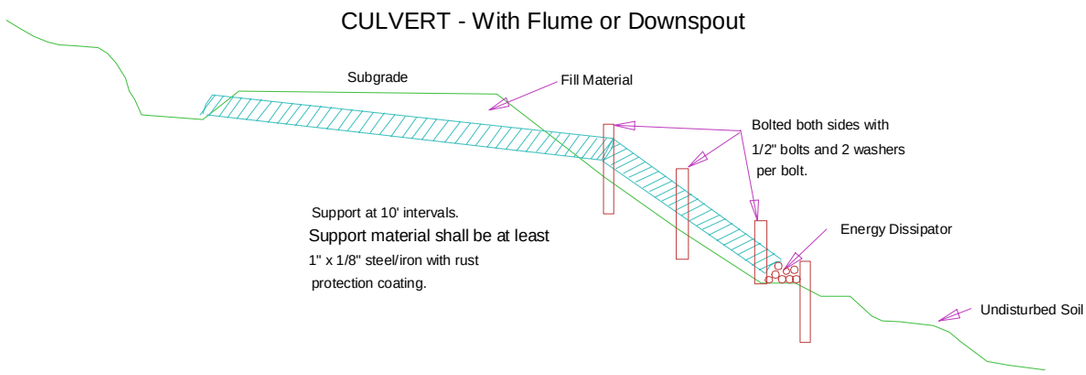
Key:

8"+ - 8 Inch Plus Rock
NT - Native (bank run)
SL - Select Fill
HL - Heavy Loose Riprap
LL - Light Loose Riprap
Flume - Half round pipe
Downspout - Full round pipe

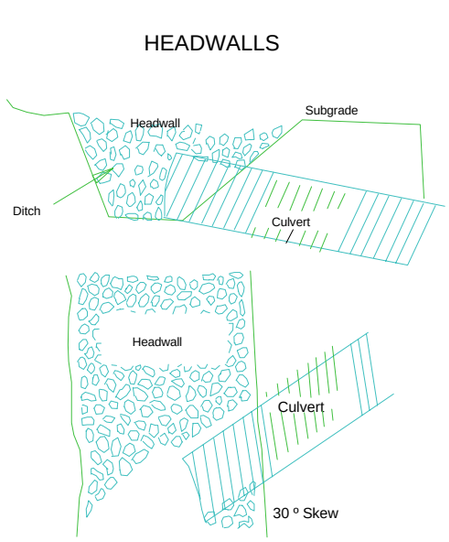
CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 1 of 2)

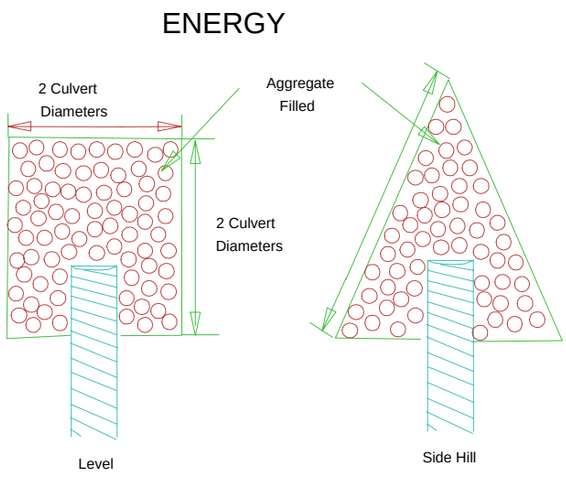




Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.



Headwalls to be constructed of material that will resist erosion.



Dissipator Specifications:
Depth: 1 culvert diameter
Aggregate: as specified in the CULVERT LIST.

CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 2 of 2)

POLYETHYLENE PIPE INSTALLATION

INSTALLATION REQUIREMENTS:

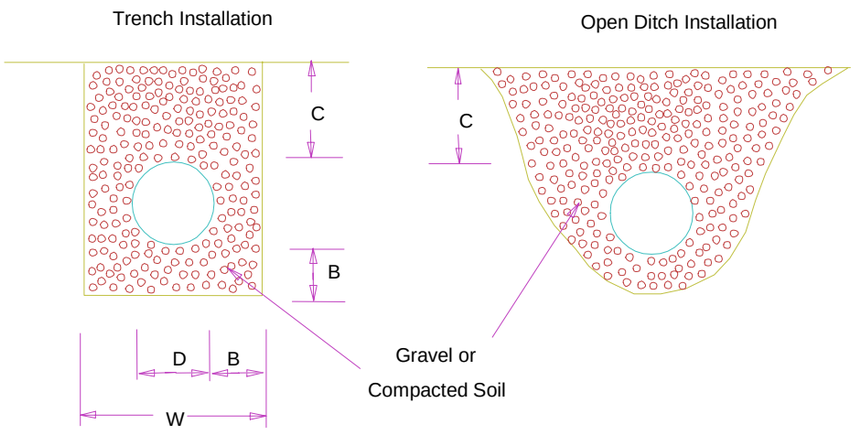
1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.

2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.

3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.

4. Site conditions and availability of bedding materials often dictate the type of installation method used.

5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% of that material is required. This minimum compaction can be achieved by either hand or mechanical tamping. Purchaser shall test the compaction level and bare all associated costs.



MINIMUM DIMENSIONS
Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

FOREST ACCESS ROAD
MAINTENANCE SPECIFICATIONS

1. CONSTRUCTION AND RECONSTRUCTION (Prior to acceptance to the contract or acceptance on a timber sale).

A. Cuts and Fills
   1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 12:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
   2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
   3. Undesirable slide materials and debris shall not be mixed into the surface material.

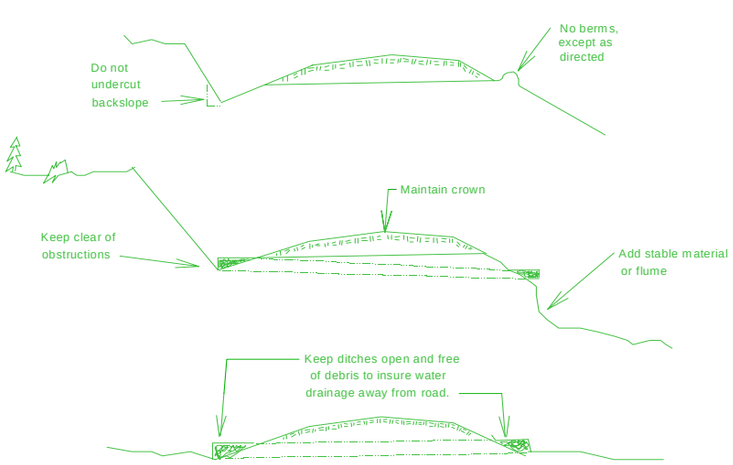
B. Surface
   1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
   2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
   3. Watering may be required to control dust and to retain fine surface rock.
   4. Desirable surface material shall not be bladed off the roadway.
   5. Replace surface material lost or worn away.
   6. Remove berms except as directed by the State.
   7. Barrel spread soft spots to prevent degradation of geotextile.

C. Drainage
   1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
   2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
   3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
   4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
   5. Keep silt bearing surface runoff from getting into live streams.

D. Structures
   Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.

E. Termination of Use or End of Season
   Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.

F. Debris
   Remove fallen timber, limbs, and stumps from the slopes or roadway.



STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

P&E RIDGE PIT DEVELOPMENT PLAN

SE ¼, SE ¼, Section 24, Township 13 North, Range 7 West, W.M.

1. Mining shall begin in Area A.

2. All vegetation including stumps shall be cleared a minimum of 20 feet beyond the top of all working faces. Trees shall be cleared to a minimum of ¾ of the height of the tallest tree adjacent to the pit. The Contractor shall maintain a minimum of 15 foot wide stripped area from the pit face at all times.

3. Overburden shall be end hauled to the designated waste area and compacted. Minimal acceptable compaction is achieved by placing waste material in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts.

4. Root wads and organic debris larger than one cubic foot in volume shall be separated from overburden material and piled in the designated waste area.

5. Quarry faces shall not exceed 30 feet in height and shall be sloped no steeper than 1/4:1.

6. Working bench width shall be a minimum of 20 feet.

7. The quarry floor shall have continuity of slope, be left in a smooth and neat condition, providing drainage to the southwest at a minimum of 2 percent.

8. Oversize material remaining in the rock source at the conclusion of use shall not exceed 5 percent of the total volume mined during that operation. Oversize material is defined as rock fragments larger than two feet in any direction. At the conclusion of operations, oversize material shall be placed as directed by the Contract Administrator.

9. At the end of operations, quarry faces and walls shall be scaled and cleared of loose and overhanging material, benches shall have safety berms constructed or access blocked to highway vehicles. Upon completion of operations in the pit, the area will be left in a condition that will not endanger public safety, damage property, or be hazardous to animal or human life.

10. All exposed soil in the waste area shall be grass seeded in accordance with Road Plan clause 5.4-3A.

11. All operations shall be carried out in compliance with all regulations of:
    a. ARegulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations@ (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration.
    b. ASafety Standards – Metal and Nonmetallic Mines, Quarries, Pits, and Crushing Operations" (296-61 WAC), Washington Department of Labor and Industries.
    c. "Safety Standards for Construction Work" (296-155 WAC), Washington Department of Labor and Industries.

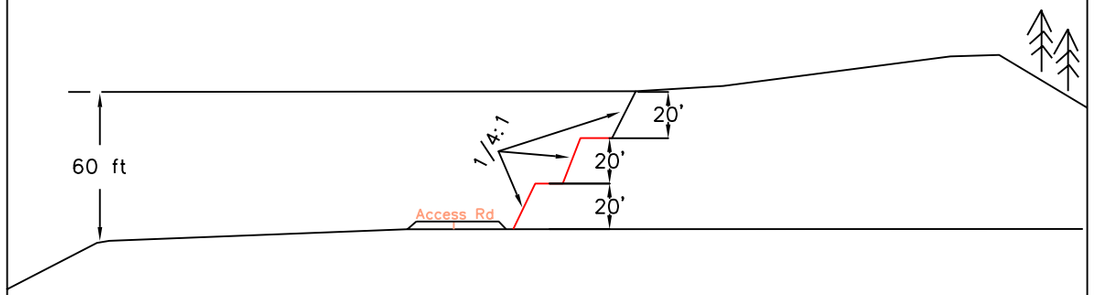
12. The Purchaser shall submit an informational drilling and shooting plan to the Contract Administrator working days prior to any drilling (Form #M-126PAC).

13. At the completion of rock source operations, Purchaser shall ask Contract Administrator for written approval of final rock source condition and compliance with the terms of this plan.

14. The pit area shall be worked and left in a condition that future operations may proceed in an orderly manner.

15. Upon completion of operations, the site shall be cleared of all temporary structures, equipment and rubbish, and shall be left in a neat and presentable condition.

Date of update 3/21/06.



Typical Cross–Section

DEVELOPMENT

Overburden and debris shall be deposited in waste areas approved by State Representative.

Mining shall begin in Area A.

Faces with heights over 30 feet shall be sloped at 1/4:1. Working bench width shall be a minimum of 20 feet.

Contractor shall maintain a 15 foot wide stripped area from the pit face at all times.

All operations shall be carried out in accordance with all Federal and State L & I regulations and State Mining WAC.

RECLAMATION

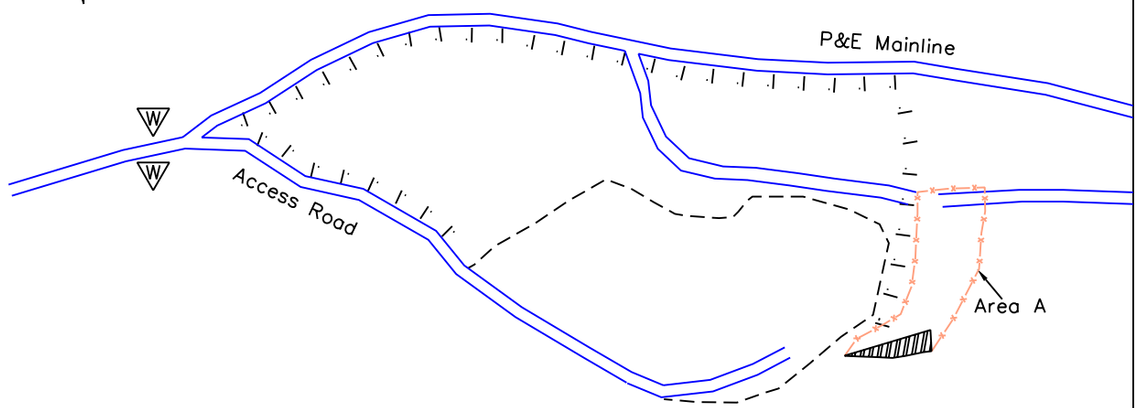
At the end of operations, quarry faces and walls shall be scaled and cleared of loose and overhanging material, benches shall have safety berms constructed or access blocked to highway vehicles. Upon completion of operations in the pit, the area will be left in a condition that will not endanger public safety, damage property, or be hazardous to human life or animals.

The pit area shall be worked and left in condition that future operations may proceed in an orderly manner.

Upon completion of operations, the site shall be cleared of all temporary structures, equipment and rubbish, and shall be left in a neat and presentable condition.

P&E Ridge Quarry
SE 1/4 Sec. 24, T13N, R07W, W.M.

P & E Ridge Quarry
SE 1/4 Sec. 24, T13N, R07W, W.M.



Active Area
Disturbed Area
Area to be mined
Waste Area
Area to remove overburden

0 50 200

SCALE = FEET

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
CENTRAL REGION

P&E EXTENSION PIT DEVELOPMENT PLAN

NE ¼, NE ¼, Section 29, Township 13 North, Range 06 West, W.M.

1. Mining shall begin in Area A.

2. All vegetation including stumps shall be cleared a minimum of 20 feet beyond the top of all working faces. Trees shall not be cut/cleared adjacent to the pit. The Contractor shall maintain a minimum of 15 foot wide stripped area from the pit face at all times.

3. Overburden shall be pushed or end hauled to the designated waste area and compacted. Minimal acceptable compaction is achieved by placing waste material in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts.

4. Root wads and organic debris larger than one cubic foot in volume shall be separated from overburden material and piled in the designated waste area.

5. Quarry faces shall not exceed 30 feet in height and shall be sloped no steeper than 1/4:1.

6. Working bench width shall be a minimum of 20 feet.

7. The quarry floor shall have continuity of slope be left in a smooth and neat condition, providing drainage to the northeast at a minimum of 2 percent.

8. Oversize material remaining in the rock source at the conclusion of use shall not exceed 5 percent of the total volume mined during that operation. Oversize material is defined as rock fragments larger than two feet in any direction. At the conclusion of operations, oversize material shall be placed as directed by the Contract Administrator.

9. At the end of operations, quarry faces and walls shall be scaled and cleared of loose and overhanging material; benches shall have safety berms constructed or access blocked to highway vehicles. Upon completion of operations in the pit, the area will be left in a condition that will not endanger public safety, damage property, or be hazardous to animal or human life.

10. All exposed soil in the waste area shall be grass seeded in accordance with Road Plan clause 5.4-3A.

11. Reclamation will not be required following use.

12. All operations shall be carried out in compliance with all regulations of:
    a. ARegulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations@ (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration.
    b. ASafety Standards – Metal and Nonmetallic Mines, Quarries, Pits, and Crushing Operations" (296-61 WAC), Washington Department of Labor and Industries.
    c. "Safety Standards for Construction Work" (296-155 WAC), Washington Department of Labor and Industries.

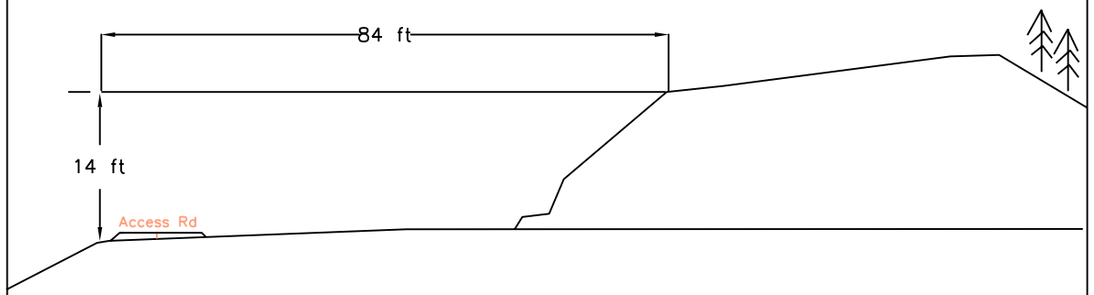
13. The Purchaser shall submit an informational drilling and shooting plan to the Contract Administrator 10 working days prior to any drilling (Form #M-126PAC).

14. At the completion of rock source operations, Purchaser shall ask Contract Administrator for written approval of final rock source condition and compliance with the terms of this plan.

15. The pit area shall be worked and left in a condition that future operations may proceed in an orderly manner.

16. Upon completion of operations, the site shall be cleared of all temporary structures, equipment and rubbish, and shall be left in a neat and presentable condition.

Date of update 3/21/06.



Typical Cross–Section

DEVELOPMENT

Overburden and debris shall be deposited in waste areas approved by State Representative.

Mining shall begin in Area A.

Faces with heights over 30 feet shall be sloped at 1/4:1. Working bench width shall be a minimum of 20 feet.

Contractor shall maintain a 15 foot wide stripped area from the pit face at all times.

All stock piled material shall be maintained in a neat and usable condition.

All operations shall be carried out in accordance with all Federal and State L & I regulations and State Mining WAC.

RECLAMATION

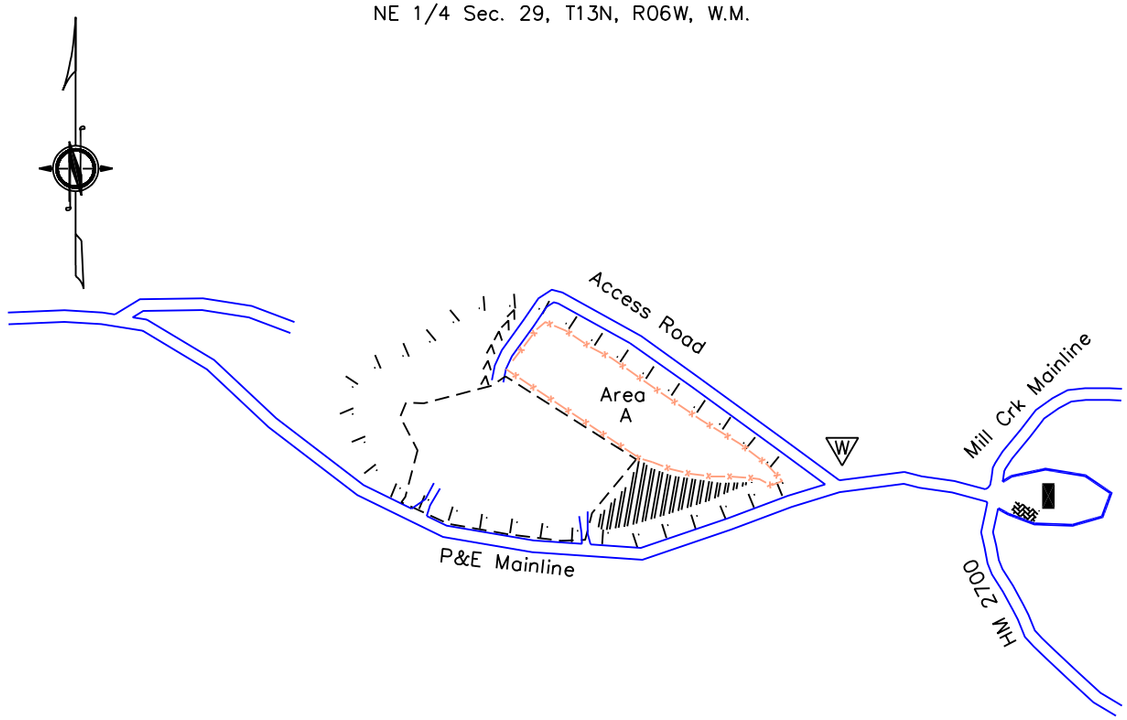
At the end of operations, quarry faces and walls shall be scaled and cleared of loose and overhanging material. Upon completion of operations in the quarry, the area will be left in a condition that will not endanger public safety, damage property, or be hazardous to human life or animals.

The pit area shall be worked and left in condition that future operations may proceed in an orderly manner.

Upon completion of operations, the site shall be cleared of all temporary structures, equipment and rubbish, and shall be left in a neat and presentable condition.

P&E Extension Quarry
NE 1/4 Sec. 29, T13N, R06W, W.M.

P & E Extension Quarry
NE 1/4 Sec. 29, T13N, R06W, W.M.



Active Area
Disturbed Area
Area to be mined
Area to remove overburden
Waste Area
Drainage
Existing Stockpile
2 1/2 Inch Minus Stockpile

0 50 200

SCALE = FEET

DEPARTMENT OF NATURAL RESOURCES - PACIFIC CASCADE REGION

FORM 9-87(Rev. 12-02)

SUMMARY - Road Development Costs

DISTRICT: Lewis

SALE/PROJECT NAME: Hemphill Hardwood CONTRACT NUMBER: 30-079010

LEGAL DESCRIPTION: Section 16, 17 , T13N, R7W W.M.

ROAD NUMBER:	P&E 1221, 1223, 1223.5, 1250,	P&E Main., P&E 1200/1220	0
ROAD STANDARD:	Spur roads (12' R.S.)	Pre-haul Maintenance	Spur road (10' R.S.)
NUMBER OF STATIONS:	56.17	272.98	0.00
SIDESLOPE:	0	0	0
CLEARING AND GRUBBING:	$11,661	$1,680	#REF!
EXCAVATION AND FILL:	$11,436	$0	#REF!
ROCK TOTALS (Cu. Yds.):			
Ballast: 5081	$50,806	$0	#REF!
Surface: 8287	$9,133	$82,767	#REF!
Riprap: 48	$244	$0	#REF!
CULVERTS AND FLUMES:	$2,754	$0	#REF!
STRUCTURES:	$0	$0	#REF!
GENERAL EXPENSES:	$6,883	$6,756	#REF!
MOBILIZATION:	$2,315	$2,315	#REF!
TOTAL COSTS:	$95,231	$93,518	#REF!
COST PER STATION:	$1,695	$343	#REF!

NOTE: This appraisal has no allowance for profit and risk.

TOTAL (All Roads) = $188,749

SALE VOLUME MBF = 2,500

TOTAL COST PER MBF = $75.50

Plans to be furnished by:

Plan only: STATE

Plan-profile:

Compiled by: Greg Johnson Date: 03/10/06

Checked by: _____ Date: _____

Region Engineer: _____ Date: _____

Div of Engr.: _____ Date: _____

REMARKS: _____

Sheet 1 of 3

PACIFIC CASCADE REGION - ROAD COST ESTIMATE

SALE NAME: Hemphill Hardwood CONTRACT NUMBER: 30-079010

I. CLEARING AND GRUBBING:

Flat Rate -	% Side Slope	MBF/ac	Disposal Factor	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
P&E 1221, 1223, 1223.5, 1250,	20%	30	1.00	2.44	$40	1.00	56.17	$5,482
								$0
								$0
								$0
R/W CUTTING					$110		56.17	$6,179

Clear and Grub TOTAL = $11,661

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
P&E 1221, 1223, 1223.5, 1250,	20%	1.00	2.00	$88	1.00	56.17	$9,886
						0.00	$0
						0.00	$0
						0.00	$0
						56.17	$0

*End Haul, Over Haul, Large Fills/Cuts	Estimated Vol. (cy)	No. of Equip. Days	Cost/day	Sub Total
End Haul/ Over Haul				$0
Stabilize excavation slope		1	$1,550	$1,550

Excavation TOTAL = $11,436

III. BALLAST AND SURFACING :

Ballast source: P&E Ridge Pit
Surface source: P&E Exten. Pit
Riprap source : P&E Ridge Pit

Description	cu.yds/sta	x stations	= cubic yards
Ballast (4"IN PLACE)	90	56.17	5,081
Surfacing (2 1/2"-)	19	36.47	693
Riprap	48	1.00	48

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & Shoot		$2.50	
Dig and load	$1.00	$1.00	$1.00
Crushing		$3.25	
Purchase			
Haul *	$4.09	$5.18	$4.09
Spread	$0.80	$0.80	
Compact	$0.45	$0.45	
Strip	$3.66		
Reclamation			
TOTAL ($/cy)	$10.00	$13.18	$5.09

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

	P&E Ridge	P&E Exten.
R.T. Miles =	10.0	14.0
Ave. Speed =	25	
Delay (Hrs.)=	0.2	
Cost / Hour =	$75.00	
CY / Load =	11	

Ballast (4"IN PL	5081	Cu. yds @	$10.00	/cu. yd = $50,806
Surfacing (2 1/2	693	Cu. yds @	$13.18	/cu. yd = $9,133
Riprap	48	Cu. yds @	$5.09	/cu. yd = $244

Rock total = $60,183

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter	No/Length	Installed Cost/ft	Sub-total
	2		18"	32	$11.80	$755
	1		18"	30	$11.80	$354
	1		18"	40	$11.80	$472
	1		24"	70	$15.75	$1,103
Bands & Gaskets	4		18"		$10.00	$40
	2		24"		$15.00	$30

Culvert total = $2,754

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $86,033

VI. GENERAL EXPENSES: Overhead & General Exp. Add 8% $6,883

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	6	$600
Grader	400	1	$400
Compactor	400	1	$400
Excavator	450	1	$450
Dozer D8)	400	1	$400
Front end loader	400	1	$400
Rock crusher	$1,500	1	$1,500
Dozer (D5)	$240	1	$240
Drill	$240	1	$240
		Total Mobilization =	$4,630

Mobilization sub-total = $2,315

Road No. P&E 1221, 1223, 1223.5, 1250,
Standard: Spur roads (12' R.S.)
Stations: 56.17

SHEET TOTAL = $95,231

By: Greg Johnson Sheet 2 of 3 Date: 03/10/06

PACIFIC CASCADE REGION - ROAD COST ESTIMATE

SALE NAME: Hemphill Hardwood CONTRACT NUMBER: 30-079010

I. PREHAUL MAINTNENACE:

Flat Rate -		Cost/ Day	No. of Days	Total Stations	Sub Total
P&E Mainline				272.98	$0
P&E 1200/P&E 1220	Grade & Compact	$1,200	1.00	119.86	$1,200
	Ditch and Culvert cleaning	$480	1.00	119.86	$480

Clear and Grub TOTAL = $1,680

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
P&E Main., P&E 1200/1220				$88	1.00	272.98	$0
					1.00	119.86	$0
					1.00	119.86	$0

*End Haul, Over Haul, Large Fills/Cuts	Estimated Vol. (cy)	No. of Equip. Days	Cost/day	Sub Total
End Haul/ Over Haul				
Large Fills/ Cuts				

Excavation TOTAL = $0

III. BALLAST AND SURFACING :

Ballast source:
Surface source: P&E Extension Pit
Riprap source :

Description	cu.yds/sta	x stations	= cubic yards
Stockpile	3000	1.00	3,000
Surfacing (2 1/2"-)	30	153.12	4,594

UNIT COSTS	Stockpile	Surfacing	Riprap
Drill & Shoot	$2.50	$2.50	
Dig and load	$1.00	$1.00	
Crushing	$3.25	$3.25	
Purchase			
Haul *	$1.50	$3.31	$3.31
Spread		$0.80	
Compact		$0.45	
Strip		$1.32	
Reclamation			
TOTAL ($/cy)	$8.25	$12.63	$3.31

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

	Surfacing	Stockpile						
R.T. Miles =	14.0	0.5						
Ave. Speed =	25		Stockpile	3000	Cu. yds @	$8.25	/cu. yd =	$24,750
Delay (Hrs.)=	0.2		Surfacing (2 1/2	4594	Cu. yds @	$12.63	/cu. yd =	$58,017
Cost / Hour =	$87.00	$75.00	0	0	Cu. yds @	$3.31	/cu. yd =	$0
CY / Load =	20	11						

Rock total = $82,767

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter (in.)	No/Length (ft)	Installed Cost/ft	Sub-total
Bands & Gaskets						

Culvert total = $0

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $84,447

VI. GENERAL EXPENSES: Overhead & General Exp. Add 8% $6,756

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	$100	6	$600
Grader	$400	1	$400
Compactor	$400	1	$400
Excavator	$450	1	$450
Dozer D8)	$400	1	$400
Front end loader	$400	1	$400
Rock crusher	$1,500	1	$1,500
Dozer (D5)	$240	1	$240

Total Mobilization = $4,630 Mobilization sub-total = $2,315

Road No. P&E Main., P&E 1200/1220
Standard: Pre-haul Maintenance
Stations: 512.70

SHEET TOTAL = $93,518

By: Greg Johnson Sheet 3 of 3 Date: 03/10/06